

The distribution and conservation status of marine turtles in The Gambia, West Africa: a first assessment

Linda K. Barnett, Craig Emms, Alpha Jallow, Anna Mbenga Cham and Jeanne A. Mortimer

Abstract This paper reports the first systematic survey of the marine turtles of the 80 km of Gambian coastline, and brings together new data and all past records and reports of marine turtles in The Gambia. Green turtles *Chelonia mydas* are the most abundant turtles and this is the only species so far observed nesting in The Gambia, with peak nesting between August and October. Although 75% (60 km) of The Gambian coastline appears to be suitable for turtle nesting, most nesting activity is confined to the southern coastline. Offshore foraging habitat is apparently extensive. Strandings of green turtles, olive ridley turtles *Lepidochelys olivacea*, leatherback turtles *Dermochelys coriacea* and hawksbill turtles *Eretmochelys imbricata* have been recorded, but we were

unable to find evidence for loggerhead turtles *Caretta caretta*. Threats are mainly of human origin, and include illegal harvesting of eggs, juveniles and adults, as well as mortality as fisheries bycatch, including trawling. One stranded green turtle apparently had fibropapilloma disease. The major threat to nesting habitats is erosion and unregulated development of the coast for tourism. Marine turtles are fully protected under Gambian law. Other national efforts to conserve turtles in The Gambia are described and assessed.

Keywords Africa, conservation status, nesting, marine turtles, The Gambia, threats.

Introduction

The biology and conservation status of marine turtle populations in The Gambia are poorly documented. The lack of information is partly due to the absence of local turtle specialists and the lack of research resources and infrastructure. Previously available information is limited to a brief study by Gruschwitz *et al.* (1991), information compiled by UNEP/CMS (1999a, b) and Fretey (2001) and local unpublished reports.

In response to this, we undertook a study to provide baseline information on the marine turtles of The Gambia. Our aims were to collate past records and data, evaluate the availability of marine turtle foraging and nesting habitats, nesting distribution and seasonality, and assess threats to and current legislation pertaining to

marine turtles in The Gambia, and the conservation measures being taken to protect them.

The Gambia became a signatory to the Abidjan Memorandum in 1999. The memorandum provides a basis for the regional conservation of marine turtles of the Atlantic Coast of Africa. For effective management and conservation measures to be put into place, however, accurate and up to date information is needed from all participating countries. This study is a first response to this requirement for The Gambia, to enable it to participate in and contribute to the conservation of marine turtles in West Africa.

Study area

The Gambia is a small West African country bordered on three sides by its larger neighbour, Senegal, and on its west side by the Atlantic Ocean along 80 km of coastline (Government of The Gambia, 1999a). The Gambia is the fourth most densely populated country in Africa, with a total land area of only c. 11,300 km² but with a large human population (1,038,175 people in 1993) and an annual growth rate of 4.2% per annum (Fatty *et al.*, 1997).

The mouth of the River Gambia bisects the coastline into two parts (Fig. 1), the North Bank with 11 km of coastline and the South Bank with 69 km (ECOLAS, 2000). Most of the coastline is undeveloped, except for widely scattered fishing villages and a few beach bars catering to tourists. The tourist industry is currently

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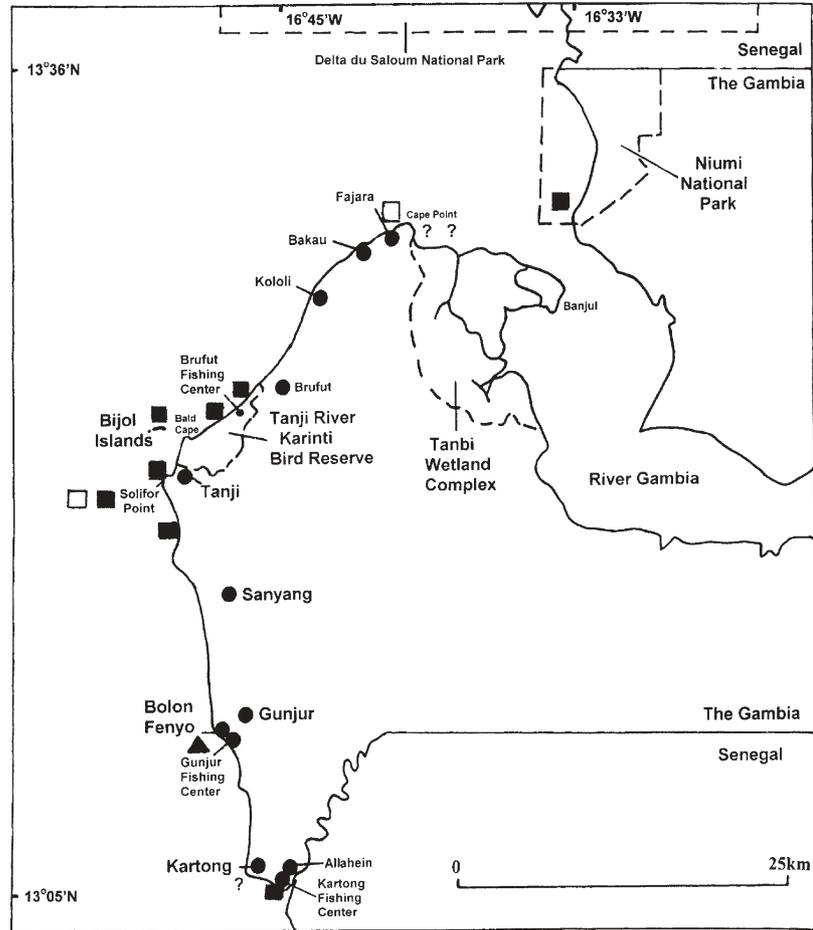


Fig. 1 Coastline of The Gambia, showing protected areas, major fishing centres and location of stranded turtles and skeletal remains. (■ = green turtle; ▲ = olive ridley turtle; □ = leatherback turtle; ? = unidentified turtle).

based mostly in the coastal area from Banjul south to Kololi. The only offshore islands are the Bijol Islands, which are two small deposits of sand, joined by a narrow sand spit, formed on shallow lateritic reefs. They are located 1.5 km off Bald Cape (Camara, 1998).

The mainland coastline comprises mostly sandy beaches backed by raised, ancient beaches. The beach substrates consist of yellowish fine to medium grained sands with a heavy mineral presence (ECOLAS, 2000). The ancient beaches form a series of broad, low ridges, parallel to the present shoreline, vegetated with coastal scrub and forest. In places there are low cliffs composed of laterite, with eroded boulders at their bases, which extend into the sea. In other areas the coastline consists of well-developed mangrove forests. Seawards the shallow continental shelf extends for a distance of 80 km (ECOLAS, 2000).

Methods

We determined the occurrence of turtle species in Gambian waters through personal observation and

collation of old records, and newspapers and journals. Old stranding reports in files and reports of the Department of Parks and Wildlife Management were examined, as were turtle specimens held by the Department. All field work was conducted by LKB, CE, AJ and AC.

Straight line turtle carapace measurements were taken with calipers, and curved measurements with a flexible tape measure as per Bolten (1999). Standard straight carapace length (SCLn-t) and curved carapace length (CCLn-t), both taken from notch to tip, were measured from the anterior point at the mid-line (nuchal scute) to the posterior tip of the supracaudals. Carapace widths, both straight (SCW) and curved (CCW), were measured at the widest point of the carapace.

We also conducted informal interviews of 60 fishermen, 24 coastal residents and 8 fisheries officers, in which we asked questions about the marine turtles they had seen. To confirm species identification we used the illustrations from Pritchard & Mortimer (1999), and questioned the informants about distinguishing taxonomic characters. During the interviews of the fishermen and coastal residents we asked about the relative

abundance and distribution of each species, as well as seasonality of mating and egg laying. The 60 fishermen we interviewed included at least three senior fishermen and two junior fishermen at each of the eight major fishing centers. Interviews were conducted in English, Mandinka and Wolof, either by the authors or with the aid of fisheries officers at the sites, or by the fisheries officers themselves.

To evaluate the availability of nesting habitats, nesting distribution and seasonality we conducted beach surveys during 1999–2000, including monthly surveys of the Bijol Islands between September 1999 and October 2000 (Barnett *et al.*, 2001). Profiles of the beach every 5 km along the 80 km of mainland coastline were documented, evaluating the characteristics of the offshore approach, the foreshore and the beach platform. We define suitable coastline as that having a sand beach platform sufficiently well developed to allow at least some nesting, along with a foreshore and an offshore approach that would not completely obstruct the emergence of a turtle from the sea (Mortimer & Day, 1999). All marine turtle strandings and skeletal remains as well as any turtle tracks or body pits (depressions left in the sand by nesting turtles; Pritchard & Mortimer, 1999) encountered during our beach surveys were recorded.

No surveys were conducted to assess the availability of turtle foraging habitat. However, relevant information was obtained during interviews with local fishermen, and from the literature. Information about threats and conservation measures was gathered during 76 of the informal interviews and by searching both the scientific and historical literature. In particular, we examined the libraries of local periodicals and newspapers.

Results

We obtained evidence for the presence of four marine turtle species in The Gambia. Forty-five confiscated green turtle *Chelonia mydas* carapaces were located at the Department of Parks and Wildlife Management, comprising a wide range of sizes (SCLn-t 26.7–91.0 cm, SCW 25.5–82.4 cm). In addition, we found the remains of five stranded green turtles and 14 fragmentary green turtle remains (we were only able to identify those that included skull fragments). One of the stranded green turtles apparently had fibropapilloma disease, as diagnosed by JAM through a visual examination of the photographs of the dead turtle.

We located only one record of the leatherback turtle *Dermochelys coriacea*, in the files of the Department of Parks and Wildlife Management. This was a badly decomposed individual, of unknown sex, found 200 m south of Solifor Point on 26 April 1998 (CCLn-t = 152 cm, CCW = 107 cm). We also located a leatherback turtle

carapace in the garden of a bar owner in Fajara who indicated that it belonged to a dead turtle washed up during March 1999 on Fajara Beach (CCLn-t = 154 cm, CCW = 108 cm).

During September 2000 a large freshly severed head of an olive ridley turtle *Lepidochelys olivacea* was confiscated by AMC from local fishermen at Gunjur Fishing Centre. The fishermen claimed that the turtle had drowned in their nets while they were fishing offshore. The rest of the turtle was not recovered.

We found only one record of the hawksbill turtle *Eretmochelys imbricata*, a single carapace of a specimen caught off the coast at Gunjur Fishing Centre during 1998 (SCLn-t = 28.7 cm, CCLn-t = 31 cm, SCW = 22.3 cm, CCW = 26.8 cm). We neither located any records nor made any personal observations of loggerhead turtle *Caretta caretta*. The localities of all turtle observations are shown on Fig. 1.

Our own observations are largely consistent with the views held by the fishermen and coastal residents. All interviewees stated that the green turtle was the most abundant marine turtle present. Of the fishermen interviewed, one third also identified hawksbill, olive ridley and leatherback turtles as being present in Gambian waters. Although we found no physical evidence or historic records of loggerhead turtles, 10% of the fishermen identified the species as being present, but in deeper waters away from the shore.

We sampled a total of 16 transects along the coast for suitability for turtle nesting. Based on our observations and using our definition of suitable, we estimate 75% of the coastline (59.7 km) to comprise habitat potentially suitable for turtle nesting. This includes the offshore islands of Bijol. The remaining 25% of the coastline, 1.3 km on the North Bank and 19 km on the South Bank, were characterized either by a narrow beach platform regularly inundated by high tide, by a beach having foreshore covered in large laterite boulders or laterite reefs extending to the foreshore, or by stretches of mangrove forest.

Interviews with local people revealed that turtles nest most frequently on the South Bank coast from the mouth of the Allehein River northwards to Sanyang. During our beach surveys we found seven recent green turtle body pits: six on Bijol Islands and one on the North Bank coast. Two additional nests to the west of Fajara were reported to the Department of Parks and Wildlife Management. The eggs of one of the nests was inspected by LKB and CE. It was found to contain green turtle eggs, and these were reburied. In addition, three nests were located on the beach within Tanji River (Karinti) Bird Reserve, with a fourth 1.5 km to the south of the Reserve. Large numbers of nests were reported on the beach a few

hundred metres north of Bolon Fenyo, near Gunjur, by local residents. Only green turtle nests have been observed in The Gambia.

Local fishermen all agreed that the breeding season for turtles extends from June to November, with a peak from August to October. This was consistent with our own observations. Of the 13 recent green turtle body pits recorded during our study, we found one in June, four in September, five in October and three in November. False crawls of at least three individual green turtles were also found in June on the beach to the north of Kartong village.

Extensive seagrass beds have been documented off The Gambian coast (Murphy *et al.*, 1997; Government of The Gambia, 1999a; Barnett *et al.*, 2000). Our interviews with local people, especially artisanal fishermen, indicate that turtles forage in seagrass beds, and also in the vicinity of shallow rocky reefs that are a common feature close to shore.

Discussion

Our study, the first comprehensive survey of the marine turtles of the Gambian coastline, indicates the occurrence of green, hawksbill, leatherback and olive ridley turtles, and possibly also loggerhead turtles. Only the green turtle has been recorded to nest, apparently from June to November. Globally green, loggerhead and olive ridley turtles are categorized as Endangered on the IUCN Red List, and hawksbill and leatherback turtles as Critically Endangered (IUCN, 2002).

The green turtle, the most abundant species in The Gambia, is widespread in West Africa, and nests from Mauritania southwards to Cameroon (Fretey, 2001). Previous studies (Gruschwitz *et al.*, 1991; Danso *et al.*, 1997; Murphy *et al.*, 1997; Camara, 1998; Government of The Gambia, 1999a; Barnett *et al.*, 2000; ECOLAS, 2000) have also recorded this species as the most common. Fibropapilloma disease, characterised by cutaneous fibropapillomas and visceral fibromass (Herbst & Jacobson, 1995) was identified in one stranded green turtle. This disease, which appears to be spreading in many populations (Herbst, 1994), has also been discovered on green turtles beached in the Saloum Delta, Northern Senegal, and the Gulf of Guinea, including São Tome, Cameroon and Gabon (J. Fretey, pers.com).

The leatherback turtle is recorded along the entire Atlantic coast of Africa but appears to be rare in The Gambia. There is one previous record of the species (Fretey, 2001), and our study confirmed its presence. The olive ridley turtle has been recorded previously in The Gambia (Gruschwitz *et al.*, 1991, Pauwels & Meirte, 1996; Murphy *et al.*, 1997) but appears to be rare. In West Africa, olive ridley nesting occurs south of The Gambia,

between Guinea-Bissau and Angola (Fretey, 2001). The hawksbill turtle occurs only sporadically along the West African coast, although it may once have nested in The Gambia (Maigret, 1983). It had previously been recorded in The Gambia from confiscated carapaces (Gruschwitz *et al.*, 1991), but the specimen observed in this study constitutes only the third record for the country. The loggerhead turtle occurs sporadically in the West African region and, although we were not able to confirm its presence in The Gambia, the species is known to nest in Guinea Bissau and Guinea and therefore is likely to occur in Gambian waters.

Threats to marine turtle populations in The Gambia include bycatch by artisanal fishermen and trawlers and nest predation by people, exacerbated by a lack of law enforcement. Suitable nesting habitat is being lost to natural erosion, illegal sand mining, and unregulated coastal development and tourism infrastructure. The only secure long-term hope for nesting turtles probably lies in the protected areas of Bijol Islands and Tanji River (Karinti) Bird Reserve. The highest turtle nesting concentrations, however, are thought to occur around Gunjur and Kartong, outside the reserves. Given the dense and rapidly rising human population in the country, additional protection at these latter areas is of paramount importance.

Nationally, the Wildlife Conservation Act of 1977 and the Biodiversity/Wildlife Policy and Regulation of 1999 protect marine turtles. Both prohibit the taking and killing of turtles and their eggs, as well as prohibiting the possession of eggs, meat or trophies of turtles (Government of The Gambia, 1977, 1999b). Despite this legislation turtles are still caught at sea and brought onto land to be butchered (Sieh, 1993; pers. obs.). Such activities prevail because of the combined lack of resources (both monetary and manpower) devoted to law enforcement, an unwillingness to enforce environmental and wildlife laws, and public ignorance of the laws.

The Department of Parks and Wildlife Management is the lead government agency in implementing national wildlife legislation and many of the international conventions to which The Gambia is a signatory, including the Bonn Convention on Migratory Species. In addition the Department also manages seven protected areas including two of which are on the coastline: Niimi National Park which includes all 11 km of the North bank, and Tanji River (Karinti) Bird Reserve, which includes 2 km of the southern coastline and the Bijol Islands. At a regional level, on 29 May 1999, The Gambia signed the Abidjan Memorandum of Understanding Concerning Conservation Measures for Marine Turtles of the Atlantic Coast of Africa (an agreement under the Convention on the Conservation of Migratory Species of Wild Animals) and has helped to prepare a regional conservation plan for marine turtles. The Gambia is also

involved in the West Africa Marine Ecoregion sub-regional process initiated by WWF and IUCN. Nationally, the Department of Parks and Wildlife Management works together with the Department of Fisheries to sensitize people about the plight of marine turtles, although both Departments are handicapped by lack of resources. Recently, attempts have been made to publicize the law and the plight of marine turtles more fully, principally by using the national media (e.g. Barnett & Emms, 2002, 2003; Drammeh, 2002). The Department of Parks and Wildlife Management has recently secured funding from the Global Environment Facility for integrated coastal and marine management. This project will collect national baseline information on marine turtles and cetaceans for the elaboration of a national conservation plan, as well as promoting public education and awareness. The Department of Parks and Wildlife Management will collaborate with the Department of Fisheries, fishing communities and a local NGO, the Gunjur Environmental Protection and Development Group, to conduct marine turtle monitoring activities along the coast.

These recent developments will enhance national sensitization and education about marine turtles. They will also encourage collaboration regionally and with overseas research and academic institutions to support a more thorough understanding of the biology and conservation status of marine turtles in The Gambia and West Africa. For conservation measures to be effective, however, such studies need to be implemented along with effective enforcement of national and international laws.

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Biographical sketches

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